In Good Company: Engaging in the Maker Movement Alongside Campus Partners

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Abstract

Makerspaces have become increasingly common in academic libraries, but libraries are not alone in their enthusiasm for the creative and innovative culture known as the maker movement. As more libraries develop makerspaces, so do other campus units and universities. This article presents a case study of the Indiana University Libraries' makerspace initiatives and their role in a larger network of makerspaces on the IU Bloomington campus. The author synthesizes examples from several institutions to make recommendations for libraries looking to contribute to the maker culture at their institution.

Keywords: Makerspaces; maker movement; academic libraries; collaboration; partnerships; creativity

Introduction

In the last decade, makerspaces have become almost ubiquitous in public and academic libraries. Makerspaces, making, and the community of creators known as the maker movement are celebrated for facilitating active learning, providing access to special tools and technologies, and bringing people together. Library makerspaces are noted for their ability to cross disciplines and offer a more inclusive environment for making.

Academic libraries are not alone in their enthusiasm for the maker movement. Just as more libraries develop makerspaces, so do other campus units. Although makerspaces promote a culture of openness and sharing, these efforts are often siloed. Much has been written about best

practices for developing library makerspaces, but few have considered how the library fits into the existing maker culture at an institution or in the community. This article will describe how one library experimented with different service models and make recommendations for libraries that want to foster a culture of making at their institution.

Literature Review

Makerspaces and the greater maker movement are a community of "hobbyists, tinkerers, engineers, hackers, and artists committed to creatively designing and building material objects for both playful and useful ends" (Martin 2015, 30). Within higher education, their history is often traced back to the first fabrication lab at the Massachusetts Institute of Technology (MIT) in 2001 (Slatter and Howard 2013, 273). Other significant milestones include the founding of Make magazine in 2005, the White House Maker Faire in 2014, and the opening of the first library makerspace at the Fayetteville Free Library in 2010 (Willingham and DeBoer 2015, 2-3; Halverson and Sheridan 2014, 495).

Makerspaces exist in a variety of contexts, but on university campuses the most common location is likely the library (Barrett et al. 2015). According to a 2015 survey from the Association of Research Libraries, 64% of respondents were already providing makerspace services and 11% were actively looking into them (Altman et al. 2015). The relationship between libraries and makerspaces varies across institutions. Some spaces are within the library and led by librarians, such as the mannUfactory at Cornell University or the Creat'R Lab at the University of California Riverside. Others reside within the physical space of the library, but are managed by non-librarians, such as IDeATe at Carnegie Mellon University. The remainder exist within departments or schools and have no library affiliation like the Sears think[box] at Case Western Reserve University or the Invention Studio at the Georgia Institute of Technology (Ali

et al. 2016). Some institutions host makerspaces both in and out of the library, though there are few examples in the literature (Herron and Kaneshiro 2017; Mathuews and Harper 2019).

The motivations for pursuing library-led makerspaces and university makerspaces are similar, but not identical. Both academic libraries and their universities are primarily interested in supporting learning, facilitating collaboration, and providing access to tools and technologies (Hynes and Hynes 2018; Burke 2015). However, libraries often cite expanding or reimagining their roles as a primary motivation (Resnick 2014; Mann 2018), whereas universities may be influenced by accreditation requirements (Wilczynski et al. 2017). University makerspaces may also focus more on curricular integration and creating maker courses (Byrne and Davidson 2015; Ali et al. 2016), while libraries seem to prioritize events, workshops, and project-based learning (Miller et. al 2018; Halverson, Lakind, and Willet 2017).

The discipline-neutral position of the academic library is a frequently cited justification for library makerspaces (Burke 2015; Halverson and Sheridan 2014; Purpur et al. 2016), but interestingly, a review of forty university makerspaces found that thirty-two were open to all members of the campus community, not just a specific department or college (Barrett et al. 2015). However, it may be the well-established reputation of the library as an inclusive space that makes libraries a fitting location for makerspaces (Halverson and Sheridan 2014).

University makerspaces and library-led makerspaces share many common goals and characteristics, but they do not appear to work in tandem. The State of Making Report from the MakeSchools organization profiled forty higher education institutions and their maker initiatives and found that "collaboration amongst and between university units/departments and colleges is not mentioned by many, highlighting an obstacle and opportunity inherent in promoting Making in higher education" (Byrne and Davidson 2015, 19). As the maker movement continues to

flourish, it's likely that more universities will establish multiple makerspaces on their campuses. Most of the literature focuses on the efforts of individual spaces, but there is little written about collaboration between multiple spaces. This paper provides suggestions and possibilities for libraries that want to join the maker movement alongside campus partners.

Background

Indiana University (IU) is a large research institution with over 40,000 students. The Bloomington campus is home to several makerspaces within different academic units and the main library. The MILL (Make Innovate Learn Lab) is in the School of Education, the MAD Labs (Makerspace for Art + Design) support the School of Art, Architecture + Design, and the Protolabs are part of the School of Informatics, Computing, and Engineering. The Herman B Wells Library is the main library on the IU Bloomington campus and is home to the library-led Mini Makerspace and the University Information Technology Services 3D Labs. Individuals in leadership positions at these makerspaces are part of an informal group known as IU Makes.

IU Libraries' Makerspace Initiatives

The Libraries' interest in makerspaces followed the inception of the Scholars' Commons, a research destination designed to connect individuals with technology, expertise, and resources. The space was envisioned as a hub for digital scholarship where scholars could get support for every phase of research, from curiosity to publication. With this renovation, two new librarians were hired to help develop the space, one with a focus on programming and outreach and another with a technology focus.

The renovation did not include plans for a dedicated makerspace, but librarians quickly identified a need to support creativity and play within the Scholars' Commons and a makerspace was an obvious choice. Makerspaces and digital humanities centers often overlap in libraries,

perhaps because both share an interest in building things, whether digital or physical. Miller et al. (2018) explain, "using an inquiry-based, constructivist learning approach, makerspaces provide a fun, accessible, and informal means of building confidence and digital literacy, the key to a digital humanities education" (91). Still, librarians had only anecdotal evidence to support the development. With this in mind, they took a gradual and experimental approach.

Maker Mondays Workshops

The first phase was to offer "Maker Mondays" workshops to gauge interest in makerspace activities. The Libraries purchased a small subset of equipment, including MaKey MaKeys, littleBits kits, Arduinos, and Raspberry Pis. The sessions were offered in various library meeting rooms from 12-1pm to encourage students and staff to attend during lunch, similar to a brown bag lecture. The first round of workshops functioned like a technology petting zoo where participants had some guidance, but mostly tinkered and explored different tools. The workshops had moderate attendance ranging from ten to twenty participants per session and received overwhelmingly positive feedback from attendees.

As of the spring 2020 semester, the Libraries have offered nearly forty Maker Mondays workshops for hundreds of participants. Screenprinting, paper circuits, soldering, and creating animated GIFs have been the most popular workshop topics. In workshop surveys, participants often comment that hands-on learning and the opportunity to try something new are the most valuable aspects of the sessions. In an article for the Indiana Daily Student newspaper, one participant described their experience at a stop motion animation workshop: "'I loved how the barrier to entry was so low. We came in knowing nothing and I'm walking away with a cute little video...I could totally see myself actually doing this. Not only for fun but for work'" (Lloyd 2018).

Maker Mondays continue to be the driving force behind the Libraries' makerspace efforts and the formula and structure remain mostly the same. The main challenge for librarians is to find projects that are inexpensive, appropriate for beginners, and can be completed in a short amount of time. Despite their limitations, these introductory workshops have played a key role in establishing a culture of creativity in the library. As librarians at the University of LaVerne point out, "without a dedicated space, a maker culture can still be supported through targeted programming" (Beavers et al. 2019, 229).

Mobile Maker Cart

After two semesters of successful Maker Mondays workshops, librarians in the Scholars' Commons used this momentum to develop a mobile makerspace. They put together an internal proposal for a mobile cart and equipment to support more workshops, classroom instruction, outreach events, and internal professional development. The proposal was quickly approved by the Libraries' Administration and they purchased items including electronics kits, musical instruments, and a desktop vinyl cutter, besides a laptop, tablet, and a tool cart and mobile shelving unit.

With the maker cart, librarians offered workshops on a wider range of topics, including screen printing, music production, and e-textiles. Librarians also reached more students at outreach events such as the Herman B House Party, an annual welcome event for first year students, and DeStress Fest, an event held each semester during midterm exams.

The maker cart was a significant step in the Libraries' makerspace journey, but it also presented many challenges. Issues with accessibility, staffing, and funding mobile makerspaces are well documented (Moorefield-Lang 2015; Martin, Compton, and Hunt 2017). Stewards of Elon University's mobile makerspace note that "ironically, and despite all the efforts taken to

make the cart mobile, the MobileMaker is not easy to transport due to its design and size" (Gierdowski and Reis 2015, 492). This was the case at IU. Although the cart has wheels, it is large and difficult to move, especially to locations outside of the library. Further, the maker cart was only accessible at events and workshops, but was primarily in a locked office without public access. To address the shortcomings of the maker cart, librarians made a case for a physical space.

Mini Makerspace

With the Scholars' Commons no longer in its infancy and new departmental leadership in place, librarians found an opportunity to propose changes. In the fall of 2018, one of eight consultation rooms was revamped as a small makerspace. The Mini Makerspace now houses the maker cart, with capacity for more equipment and supplies and a small work area. Graduate students from the Information & Library Science department provide open hours on weekday afternoons wherein students are invited to drop in and make. Having a dedicated space has also allowed for an equipment checkout program. A handful of equipment items are available for a one-week loan period. Digital cameras and handheld audio recorders are in high demand.

The Mini Makerspace acts as a store front for the Libraries' maker initiatives, where staff inform students about workshops, equipment, and other campus resources. The space can accommodate only four people comfortably during drop-in hours and thus Maker Mondays workshops continue to be held in large library meeting rooms. The small space is limiting, but still provides opportunities for student engagement.

IU Makes

The IU Libraries are an active member of the IU Makes group, which was formed in 2013 with a broad goal of developing a central makerspace on campus. After several departmental

makerspaces opened independently, the group shifted its priorities to support this new collective. Members explained that their involvement was voluntary and not directed by administration and noted that: "this allows the organization to function in a nimble manner; able to move from idea to action untethered by the bureaucracy, red tape, and slower pace that accompanies a hierarchical structure" (McKay et al. 2017, 4). In the future, the spaces will continue to operate autonomously, and will keep working toward a common goal of supporting the thriving maker community at IU Bloomington.

Recommendations

Halverson and Sheridan characterize the maker movement as having three components: "making as a set of activities, makerspaces as communities of practice, and makers as identities" (2014, 496). Libraries often focus on the physicality of makerspaces, but collaboration, creativity, and innovation do not require space or equipment. Based on the IU Libraries' endeavors, their participation in the IU Makes group, and themes in the literature, the author developed these recommendations for academic libraries looking to engage in the maker movement, with or without a makerspace.

Identify Needs

For academic libraries investigating makerspaces, it is imperative to evaluate what is already happening on campus and determine if and how the library can address a need that is not being met (Mathuews and Harper 2018, 358). While the IU Libraries moved from workshops to a mobile maker cart to a small makerspace, five makerspaces emerged on the Bloomington campus. Librarians initially envisioned their activities as a pilot project that would lead to a large dedicated space, but the drastic change in campus resources in a short while challenged the need for yet another fully fledged makerspace. Fortunately, the Libraries found a niche that allows

them to serve their students so it compliments but does not compete with other makerspaces on campus. The Libraries' actively support making through drop-in hours, workshops, and an equipment checkout program. With this foundation in place, they can explore other avenues for engaging in the maker movement in collaboration with their campus partners.

Create a Network

Many makerspaces are siloed and removed from their greater campus communities, but there is great potential for those who break down barriers and build partnerships. Establishing these relationships can be challenging when you consider differences in budget, personnel, and objectives, but libraries are well situated to cross divides. Librarians should start by identifying maker services on campus and staying abreast of developing initiatives. Woodshops, machine shops, art studios, media labs, and science labs often function similarly to makerspaces and provide access to comparable equipment. Librarians should also look outward to their local communities, including public libraries, museums, and independent makerspaces. Creating connections among these entities is a great way to get guidance and support. Librarians at the Indiana University School of Medicine note that "collaboration between departments outside of the Medical Library has generated a 'brain trust' which the library staff can contact for advice and troubleshooting technology" (Herron and Kaneshiro 2017, 7).

Once potential partners have been identified, librarians should schedule an informal meeting to bring the players together. There are various levels these partnerships can take, but establishing communication is a key first step. These partners may already work together and if so, the library can join any existing working groups and/or serve as a gathering point. Libraries are often ideal meeting places, considering that many campus departments do not have adequate space and may not be centrally located. The five members of the IU Makes group meet in the

library once each semester with a primary goal of information sharing. Meetings begin with updates from each makerspace and news about events and initiatives on campus. The group is intentionally small and informal, making it easier for members to participate. Working groups like this do not require a significant time commitment and provide a support system for librarians that may not exist within the library. It is worthwhile for librarians to pursue creating or maintaining these networks.

Write a Mission Statement

Maker educator Kristin Fontichiaro recommends that makerspaces develop a plan or mission statement, writing that "sustainable makerspaces are created by those who know how to articulate their vision for the future and the purpose for having a makerspace" (2016, 39). The same can be done for campus makerspace networks. A successful mission statement should establish a mutually beneficial relationship for all partners and create a guiding structure for the group's work. Fontichiaro provides a fill-in-the-blank statement that can be a template for creating a mission statement (40). Adapted for this context, a mission statement of this type might read:

> Based on the increase in making at our campus, I see that our students need opportunities to become information producers and creators, rather than merely consumers. Therefore, we'd like to launch a campus makerspace network that will give them the chance to connect to tools and resources across disciplines. In this program, we will prioritize big picture challenges that face each of our spaces. We will know that we are successful if we find a greater diversity of students engaging in making.

By creating a mission statement, makerspace networks will be better positioned to collaborate on grant proposals, curriculum development, and other initiatives.

Spread the Word

Librarians can make a significant impact by advocating for their fellow makers through referrals, online tools, and outreach events. Taking an active role in the IU Makes group helped to situate the IU Libraries at the hub of the maker community. The library is now more knowledgeable of activities happening on campus and the resources available at different makerspaces. This means that the library can refer students and faculty to these spaces, like how a reference librarian might refer a student to a subject librarian or other resource. Staff in the Mini Makerspace actively connect individuals with makerspaces beyond the library using an approach similar to the reference interview.

Developing a web presence is another way to spread the word. The IU Makes website is a valuable tool for making connections (iumakes.indiana.edu). Users can easily navigate to the site for an overview of makerspaces on campus and redirect to departmental websites for more details. Similarly, the group also created a virtual tour of their spaces using the library's 360-degree camera and shared the results at a campus wide festival using Google Cardboard viewers. IU Makes partners are currently investigating an interactive app similar to Mobius, developed at MIT (Ali et al. 2016), in order to allow users to identify which space is best suited to their needs. Whatever the platform, librarians can take a leadership role in promoting their own spaces and initiatives, and their partners'.

Host Introductory Workshops

University makerspaces often support more technically advanced forms of making because they build on experience gained through coursework, but libraries can act as a gateway to the maker movement by removing technical barriers and starting with more accessible activities (Fontichiaro 2019). The IU Libraries' Maker Mondays workshops are viewed to introduce

students to the maker ecosystem and develop skills that will benefit them as they pursue more technically challenging projects. For example, the Libraries have offered several workshops utilizing the Silhouette Cameo cutting machine, a desktop crafting tool. In one workshop, students created laptop sticker designs in Adobe Illustrator and cut them out of vinyl sheets using the Cameo. In another session, students followed a similar process and used their vinyl stickers to screen print on canvas tote bags. Because of these workshops, students learn basic two-dimensional design principles that translate to working with laser engravers or cutters at other makerspaces on campus.

Create an Equipment Lending Program

Unlike their campus colleagues, libraries already have the infrastructure to support an equipment lending program. With this in mind, the MIT MakerWorkshop recently partnered with the MIT Libraries to create the "Equipment to Go" program. They explain: "MakerWorkshop is not equipped to do inventory tracking, holding users accountable for missing parts or kits, and our hours do not match when students might need to check out tools. We contacted the MIT Libraries realizing they are well equipped in all of these areas" (Buchman and Dorsch 2017, 1).

Library makerspaces may already have their own equipment lending programs, but they can extend their reach by working with campus partners to identify equipment that is most useful to their students and providing it for checkout. Equipment lending programs allow students to make in a variety of environments on their own terms, creating even more possibilities for creativity and innovation.

Support Pre and Post Making

Though equipment lending is a natural strength of libraries, Mathuews and Harper (2018) caution libraries not to focus solely on equipment when participating in the maker movement .

They argue that libraries should consider the processes before and after the physical act of making, such as ideation and collaboration, followed by presentation and preservation. According to Mathews and Harper, "no longer focused on amassing the latest trendy equipment that may not be useful to a broad audience, the library can focus on what it has historically proven to do best—provide space for intellectual curiosity, discourse, and ideation while serving as a repository to collect, preserve, and make accessible the fruit of the truly exciting modern makerspace movement" (359).

There are numerous ways that libraries can support pre and post making activities. As an example of how a library might participate in the pre-making phase, the Curtin Library Makerspace hosted a "Cultural Makathon" wherein scholars were invited to develop prototypes and experiment with data. Project members note that, "the Library played an important role in the Makathon, not only by providing the space and organizational support, but also by participating in the Makathon, as former or existing library staff members were well represented on the teams" (Miller et al. 2018, 100). Similarly, in 2017, IU's Institute for Digital Arts and Humanities hosted lectures and workshops related to gender and equity in makerspaces at the Wells Library, welcoming researchers, librarians, and faculty from across campus to participate.

On the flip side, libraries are also well equipped for post-making. Exhibiting and preserving maker projects are fitting endeavors for libraries. For example, librarians at the University of LaVerne hosted a maker faire to showcase local maker projects. Their goals included "bringing different library and university constituents together, raising awareness of the maker movement to a wider university community, and demonstrating some of the maker tools available in the library" (Beavers et al. 2019, 222).

Many libraries also have the infrastructure to preserve digital objects, 3D objects, and other materials. Librarians from the University of Idaho makerspace and special collections and archives unit collaborated to 3D scan, print, and preserve a historically significant artifact (Passehl-Stodart et al. 2018). Likewise, in a Maker Mondays workshop at IU, participants created short films by cutting, painting, and writing on 16mm film, a technique known as direct animation. Their creations were later digitized and hosted online by the Libraries' Moving Image Archive. These examples demonstrate that libraries can be active collaborators in all phases of maker projects.

Conclusion

Makerspaces in higher education have gained significant traction in the last decade and the number of makerspaces on university campuses is expected to increase in the coming years (Becker et al. 2018). When institutions establish multiple makerspaces, libraries are well positioned to connect disparate groups and contribute to a more unified approach to making at their institutions. Libraries can implement a variety of makerspace models to complement existing services on campus, many of which are not defined by physical space. As more academic libraries join the maker movement, they must work with their campus peers to foster a creative, inspiring, and innovative culture both inside and outside of library walls.

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